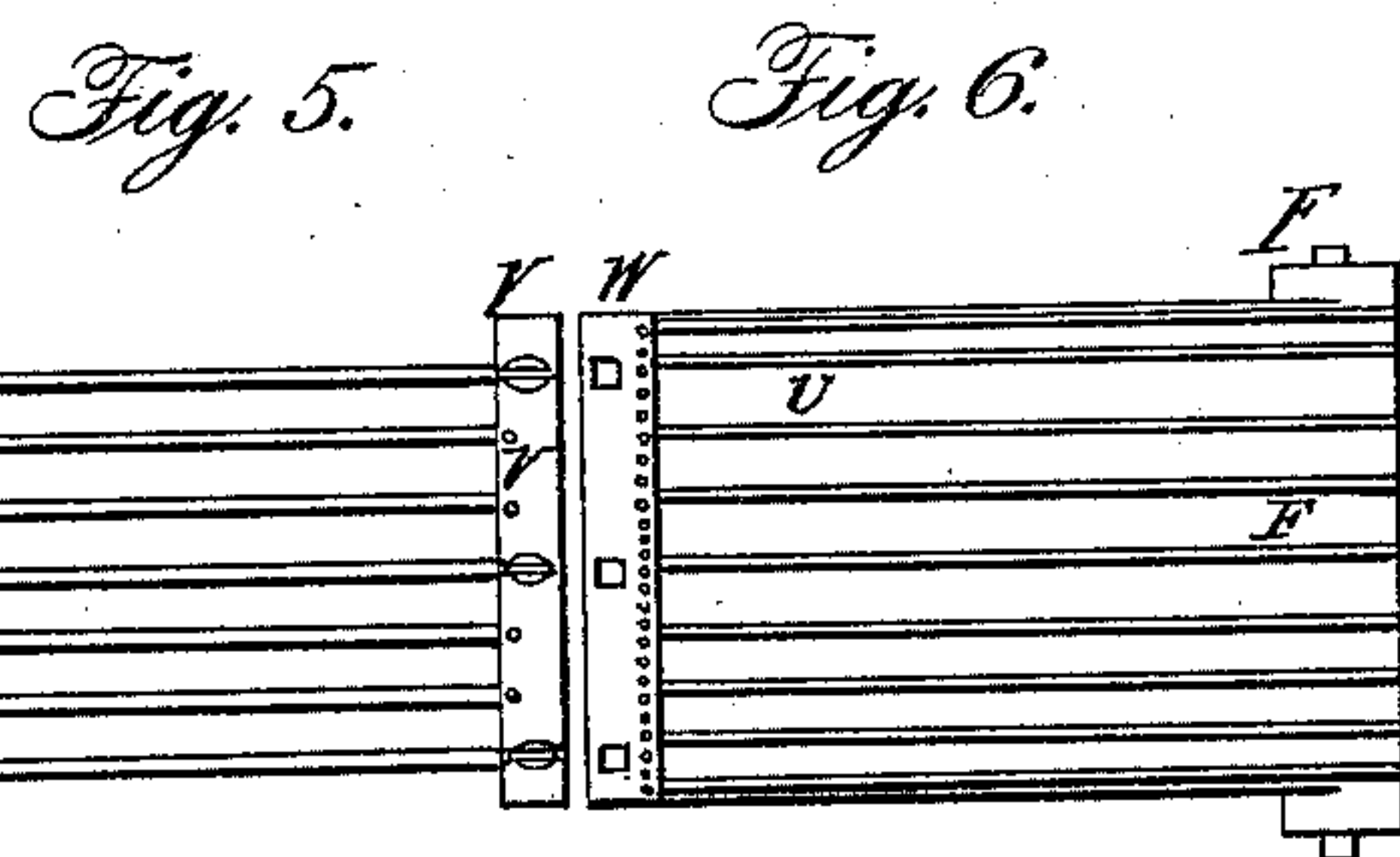
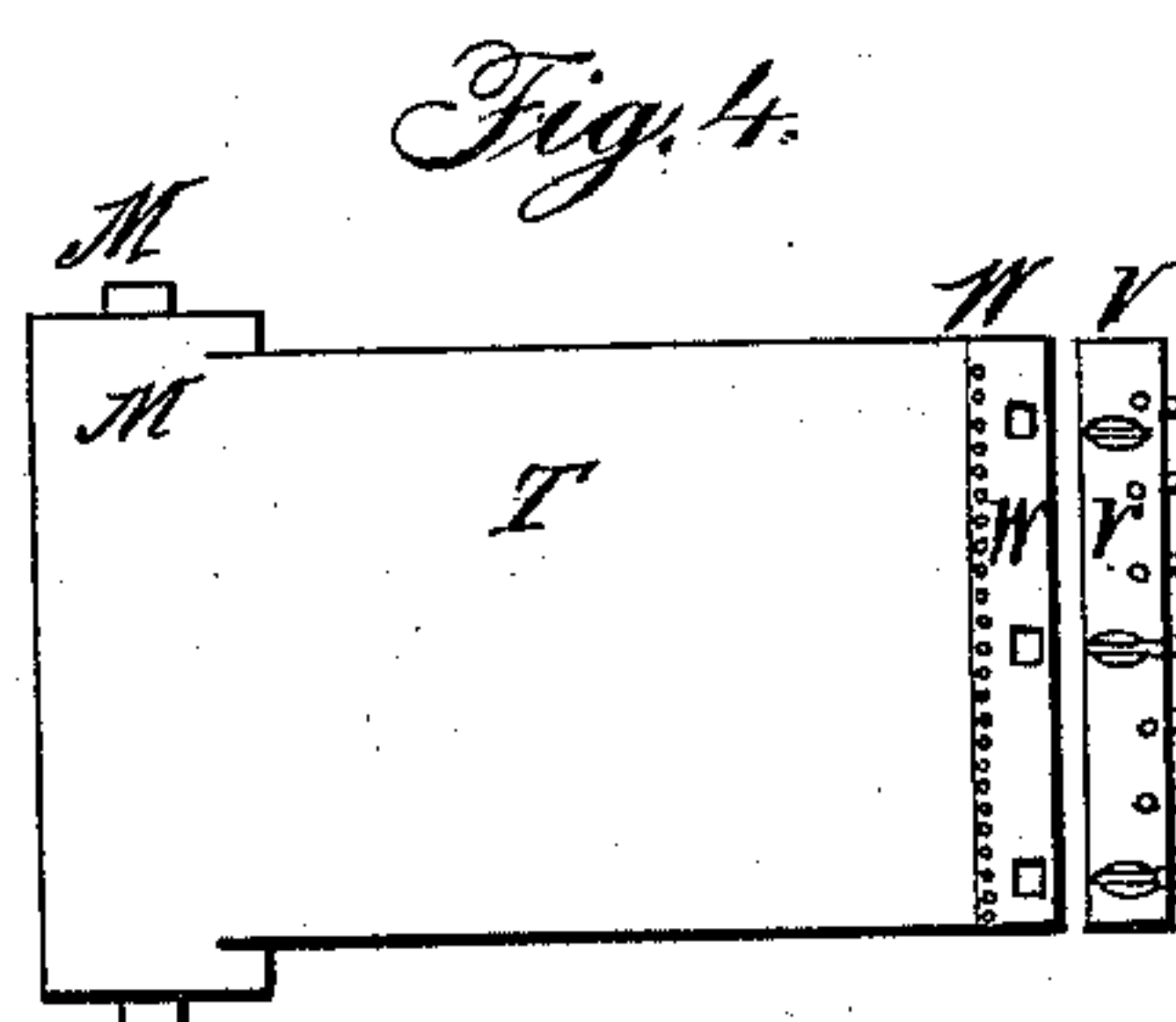
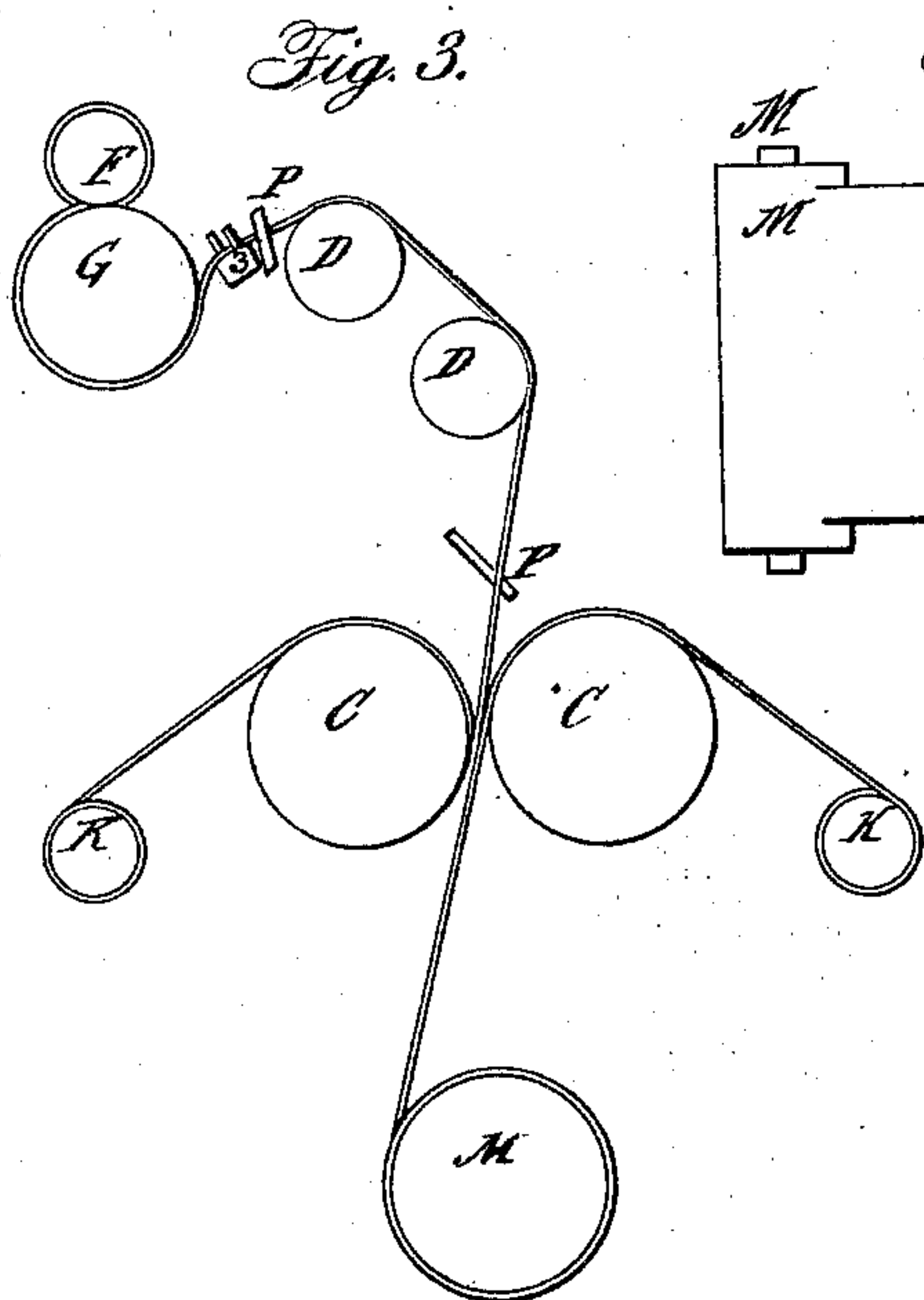
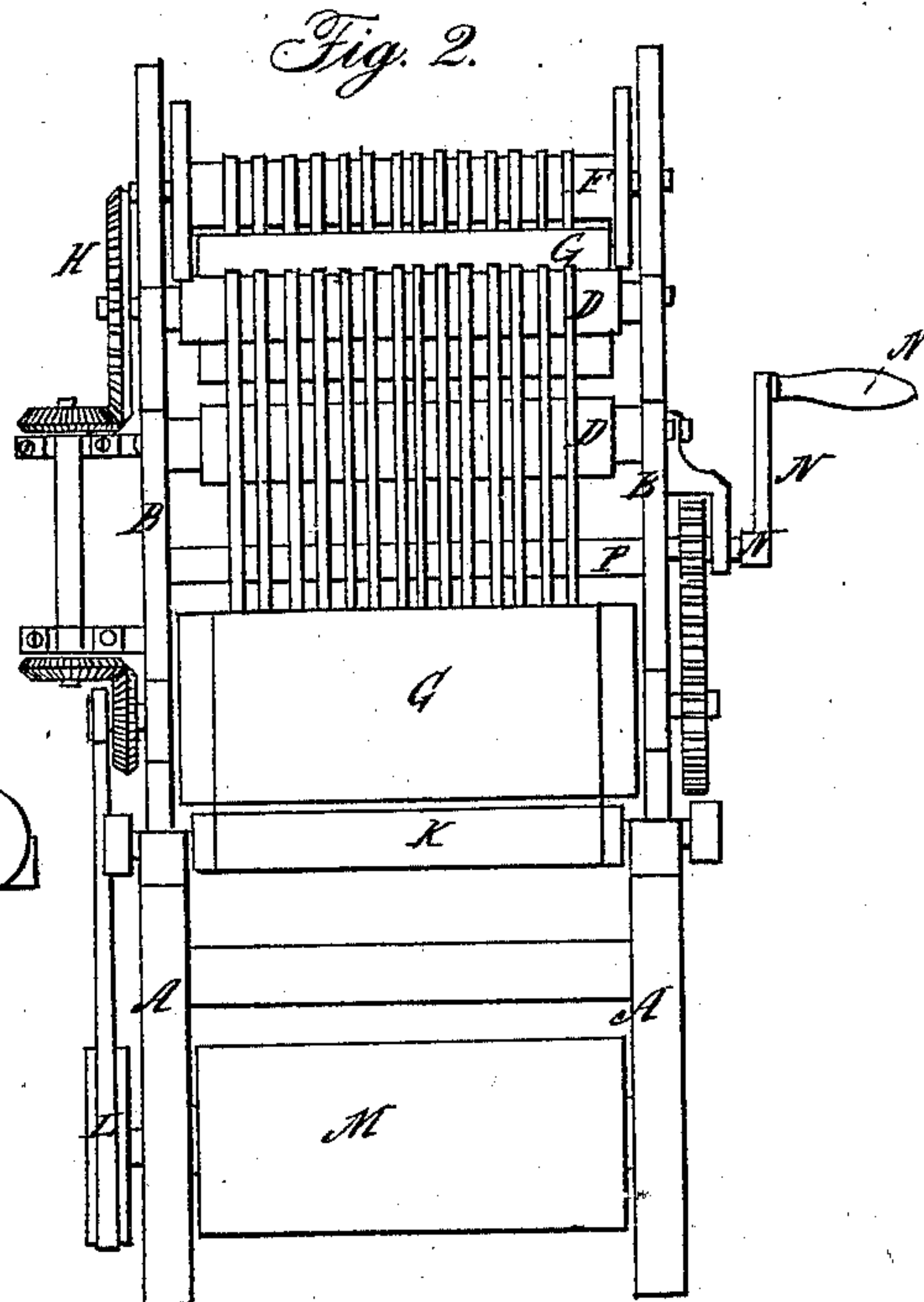
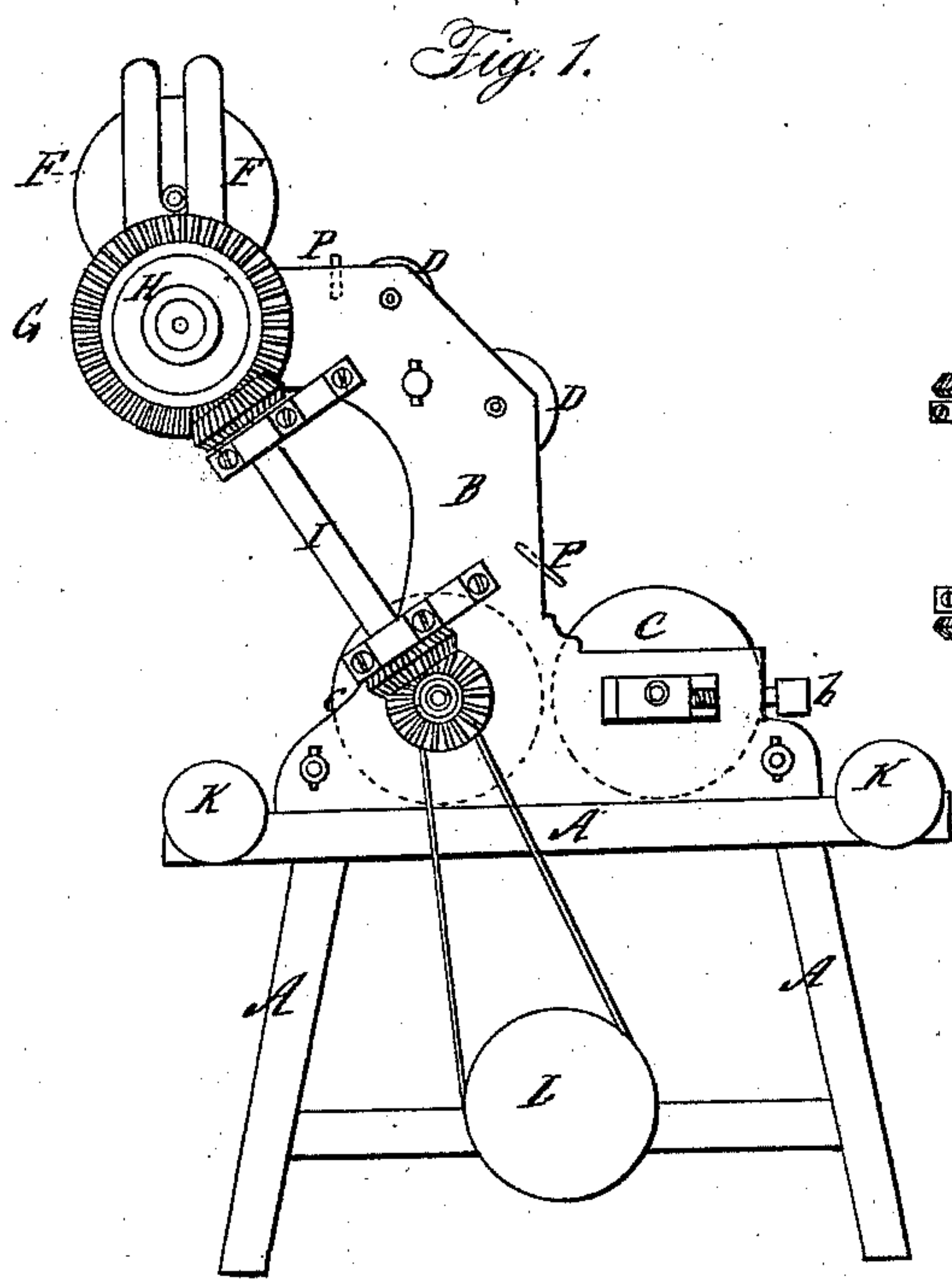


H. H. DAY.  
Cutting Soft Rubber.

No. 3,788.

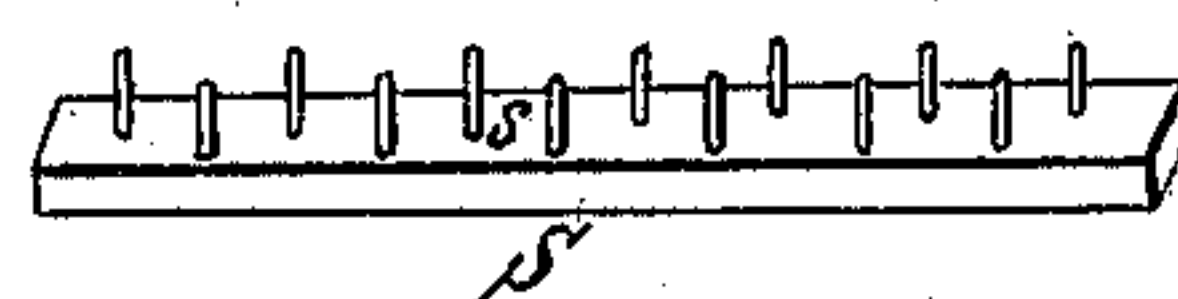
Patented Oct. 12, 1844.



*Fig. 7.*



*Fig. 8.*





# UNITED STATES PATENT OFFICE.

HORACE H. DAY, OF JERSEY CITY, NEW JERSEY.

## MACHINE FOR MANUFACTURING CORRUGATED OR SHIRRED INDIA-RUBBER GOODS.

Specification of Letters Patent No. 3,788, dated October 12, 1844; Antedated June 19, 1844.

*To all whom it may concern:*

Be it known that I, HORACE H. DAY, of Jersey City, on the county of Hudson, in the State of New Jersey, have invented a new and useful Manner of Constructing Machines for Manufacturing India-Rubber Corrugated or Shirred Goods; and I do declare that the following is a full and exact description.

The nature of my invention consists in combining with rollers constructed with elastic surfaces, certain drums and other appurtenances for stretching threads of india rubber to any given desired length and the covering of said threads with india-rubber cloth on both sides.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

*Explanation of the figures of Day's corrugating machine.*—Figure 1, of the drawings herewith sent and which are intended to constitute a part of my specification, shows an end view of my machine and the gearings by which an unequal motion is communicated from the compressing roller C, C, and drum. Fig. 2, represents a front view as also the arrangement of the driving gear on one end and also that which connects the compressing rollers with the drum and beam (by which the tension of the threads is given) on the other end. Fig. 3 (another end view) shows the relative position of all the rollers, drums, ruddles and combs as also the passage of the threads and cloth in the act of being made into corrugated goods. Fig. 4 shows the apron to which is attached one of the plates W with eyelet holes attached at the other end to the receiving drum M. Fig. 5 shows the threads and the manner of holding them at each end into eyelet holes of the plates V, V, prior to beaming them up. Fig. 6 represents a piece of corrugated goods—one end nailed fast to the spool and the other sewed fast to one of plates W—the use of which is to permit the threads to pass quite down to the compressing rollers to prevent waste at the ends when coming to the end of the piece. Fig. 7 represents one of the combs P, P. Fig. 8 represents the ruddle or dividing pins which is used in beaming the threads to guide them regularly when being beamed on the spool also to separate them partially during their passage on to the comb when the machine is in motion.

L in Figs. 1 and 2 is intended to represent a pulley over which a band passes which band serves to communicate power from a small pulley on shaft of one of the compressing rollers to the taking up drum M whereby the goods are beamed up at full tension.

The same letters have reference to all the figures.

A is the wooden bench or frame to support the machine and may be made of such convenient height as will enable the operator to reach every part of the machine when at work. The size I prefer is about three feet high, two and a half wide and about two feet long at the top and about three feet where the legs touch the floor.

B, B are the two side frames of cast iron, wood or such other material as may be preferred and are securely attached to the bench by bolts and supported at proper distances apart by suitable iron rods. Those side frames may be made of various shapes but I prefer that of a quarter circle as most convenient, their use being to support in their proper places the spool, drum, loose rollers, dividing pins and combs.

C, C are two rollers of wood or iron with suitable bearings one of which is intended to be stationary and the other to move back and gaged at suitable distances apart by means of screws in the side frames. These are covered first with a solution of india rubber, then with a thin sheet of the same after which there is one of more thicknesses of cloth or felt or other suitable fibrous yielding substances, the whole varying in thickness from one eighth to one half inch firmly attached by cement to impart to the rollers an elastic crust or covering.

G is a drum placed at the upper extremity of the frame and securely attached to the shaft, the journals of which pass through the side frames and run in it. This drum should be of the same diameter as the compressing rollers C, C, after they are covered with their elastic crust. This roller or drum is covered with sheet rubber to prevent the threads slipping when passing over. This drum in connection with the spool with which it is in immediate contact serves to give tension to the threads of rubber during their passage from it, by reason of the threads passing around and laying flat on it. Securely attached to one end of this drum is a bevel wheel H of such relative



size as may be required, reference being had to the degree of tension intended to be given to the threads.

I is an upright shaft standing on the line of center between C and H; on each end of which are small bevel wheels one of which runs in the large bevel wheel H, and the other into another small bevel wheel which is securely pinioned fast to shaft of one of the rollers C, C. By this arrangement the drum G is made to revolve only one-half or one-third (as may be required) as fast as the compressing rollers C, C, whereby an exact and uniform tension is given to the threads of india rubber.

F is a large spool or beam with flanges at each end on which the threads of rubber are rolled, or beamed up. It rests on the drum G, the flanges passing down at each end to prevent lateral motion and also to permit it to descend as the threads passing off lessen its diameter, whereby it will be always in close contact with the drum G. Of these spools there should be more than one to each machine, changing them as new batches of threads are required to be put in. Attached to each of these spools there is always required an elastic apron, seen in Fig. 6, of sufficient length that it will at tension reach down to the compressing rollers; its object being to deliver the threads down to their very ends to the compressing rollers. On the end of this apron is one of the plates W into which the thread holder V is hooked.

K, K are small shells or rollers with square holes through their centers to slip on and off of a shaft the journals of which rest in a box attached to the wooden table or frame, their use being to wind and deliver off the cemented cloth used to cover the threads in forming the fabric.

S, Fig. 8, is a ruddle or double comb the pins in which are securely placed at equal distances in a piece of timber or metal and is useful in directing the threads after they leave the friction drum, as also in the beaming process when the threads are being wound on the spool.

P, P are combs or guides made of thin plates of iron with notches in one edge to guide the threads evenly and truly and of uniform distances apart in their passage from the friction roller to the compressing rollers and also to prevent the passage of twists in the threads for which combined with the loose rollers they are perfectly adapted. The first of these combs is placed of convenient angle to permit the passage of lumps or knots in a line between the surface of friction drum G and upper surface of the loose roller D. The position of the ruddle heretofore described is between this comb and the main friction roller on drum G.

D, D are loose rollers over which the threads pass and are used to prevent too

great pressure on the combs and in connection with them to prevent twists in the threads from passing to the compressing rollers.

T, Fig. 4, is an apron of any desirable textile fabric attached securely at one end to the receiving or taking up drum M of such length as will reach up through the compressing rollers in the line of the passage of the threads to the friction drum G. On the end of this apron is securely fastened a thin plate of metal with three or more eyelet holes in it in which the hooks of the thread holder is placed.

Fig. 5 shows the manner of attaching the threads of india rubber to the holders previous to their being beamed up on the spool. The holders V, V are thin plates of iron or other metal with eyelet holes for attaching them to the apron plates on one edge and on the other the small holes in which the threads are tied; said holes being about one-eighth of an inch apart more or less.

U in Fig. 6 is the elastic or corrugated cloth, one end of which is attached to the spool F, the other by means of plates heretofore described is attached to the threads or warp, its use being to permit the threads to pass over the friction drum quite down to the surface of the compressing rollers C, C, so as to avoid any waste of threads.

M is a large drum moved by a belt passing from a small pulley on one of the compressing roller shafts on to one on its own shaft. This drum is of such calculated diameter as may be required (reference being had to the length of the threads) and is used to wind up the formed goods at nearly full tension; its object being to hold the threads and cloth at full tension until a second pressing between the elastic rollers can be effected, whereby a more perfect finish is given to the goods. This second pressing is given by simply reversing the motion of the machinery after the piece of goods is all formed and before it is removed from between the elastic rollers. By this method also the piece of formed or finished goods can be removed from the machine by simply unhooking the plates and cutting off the threads just at their junction with the plate into which they are tied before beaming.

N seen in Fig. 2 represents an ordinary crank and shaft running in suitable bearings attached to which is a cogwheel pinion working into one of the wheels which connects the elastic or compressing rollers together and is the method by which the whole machinery is moved.

By my method of stretching the threads of india rubber only that part of the thread is elongated at the same time, which is in immediate contact with the forming part of the machine whereby the difficulty of threads breaking, flying back, and entang-



ling is completely overcome, and the work can be accomplished in much shorter time and without waste or the necessity of tying knots or taking out threads as by the old method of stretching the whole length of the threads at the same time and keeping the same in a stretched state till the combination is effected with the cloth by which they are covered.

10 In the construction of these machines I sometimes make my friction drum of less diameter than the compressing rollers regulating the tension of the threads substantially the same way, only by this arrangement the friction drum bears an unequal proportion with the compressing rollers, and the connecting wheels in this case may be of the same diameter on both friction drum and compressing rollers, the whole working in combination by which the same result is produced.

I do not intend to confine myself to any particular number of ruddles, combs or friction rollers, intending to use as many such as may be necessary to do the work in the most advantageous way. Nor do I limit my claim to any particular contrivance by which to produce unequal speed between the friction and compressing rollers, using any such as will answer the purpose.

I do not claim the invention of compressing or calender rollers or the gearing with

which they are driven the same having been in common use in the manufacture of india rubber and for other purposes.

I do not claim the rollers on which the cloth which is to cover the threads is beamed up or rolled the same having been in common use in india rubber and other factories, nor do I claim the drums or cogwheels or bevel wheels as new in themselves.

I do not claim that part of the side frame in immediate contact with the table and in which the compressing rollers revolve such part being in common use in india rubber and other factories.

What I now do claim as my invention and desire to secure by Letters Patent in the above described machine is—

The combining with two compressing rollers C, C, one or more friction drums or rollers covered with suitable friction material and combining with these the roller M together with the spool F and elastic band or apron to which the threads of india rubber are attached, the whole being connected and working together in manner substantially as above set forth and made known.

HORACE H. DAY.

Witnesses:

SAML. R. SYMS,  
VERNOR CUYLER.